REMARKS

In the Official Action of September 22, 2005, the Examiner objected to previously presented arguments directed toward dependent claim under 35 USC 112, second paragraph, as being indefinite; rejected claim 31 under 35 USC 101 on the basis that the claimed invention is directed to non-statutory subject matter; rejected claims 1-2,4,6-7,11-12,14,24,26, and 30-31 under 35 USC 103(a) as being unpatentable over Ishisaka (US 6,289,126) in view of Schultz et al. (US 2001/002315 A1); and rejected claims 3,5,8-10,15-17,23,25 and 27-29 under 35 USC 103(a) as being unpatentable over Ishisaka in view of Schultz and further in view of Ross et al (US 6,608,628); claims 18-22 are further rejected under 35 USC 103(a) as being unpatentable over Ishisaka in view of Schultz and further in view of DeYong et al. (US 6,577,757). The present communication is fully responsive to the Official Action of September 22, 2005.

Rejections Pursuant to 35 U.S.C. §112

In response to the failure to comply with the written description under 35 USC 112, first paragraph, as applied to claim 14, Applicant elects to cancel claim 14 from the presently pending application. In view of such a cancellation, Applicant believes that the Examiner's rejection is under 35 USC 112 is now moot.

Rejections Pursuant to 35 U.S.C. §101

Responsive to the Examiner's rejection of claim 31 under 35 USC 101, Applicant respectfully submits amended claim 31 wherein the term "computer useable medium" has been replaced with "computer readable medium". Applicant believes that such a amendment is in keeping with the scope of the present invention, introduces no new matter, and sufficiently overcomes the Examiner's rejection to claim 31 under 35 USC 101.

Rejections Pursuant to 35 U.S.C. §103(a)

The Examiner has rejected claim 1-2, 4, 6-7,11-12,14,24,26 and 30-31 under 35 USC 103(a) as being unpatentable over Ishisaka in view of Schultz. The Examiner has further rejected claims 3,5,8-10,15-17,23,25 and 27-29 as being unpatentable over Ishisaka in view of Schultz and further in view of Ross. Of these rejected claims, claims 1, 30 and 31 are presently

independent. Applicants respectfully traverse the Examiner's rejections on the basis that the cited art fails to teach or suggest each element of the presently pending claims.

Summary of Ishisaka

Ishisaka recites a method for detecting the boundary of an object is determined based on its optically captured image by first converting a density data of each of a plurality of pixels forming the captured image into a binary signal. The binary signal is then converted into a neighbor pixel state value so that only the pixels located on the boundary r in the interior of the object have a value corresponding to the binary signals of the surrounding pixels. The neighbor pixel state value is then normalized using an absolute chain direction value of a previous chain direction. A relative chain direction value for a pixel located on the boundary of the object in the image relative to the direction from which the chain has proceeded is then obtained, with reference to the neighbor pixel state value of the pixel. Next , an absolute chain direction value of a next chain direction on the basis of the relative chain direction value is calculated. Finally, the aforementioned steps are repeated for each pixel located on the boundary to trace the boundary of the object for determining the boundary.

Summary of Schultz

Schultz recites a method and apparatus for interrogating a target having a plurality of plasmon resonant particles (PREs) distributed within the target. A field containing the target is first illuminated, followed by the detection of one or more spectral emission characteristics of the light-scattering particles in the field. Based upon this data, an image of positions and spectral characteristic values in the field is constructed, allowing PREs with a selected spectral signature to be discriminated from other light-scattering entities, to provide information about the field.

Arguments

Applicant respectfully submits that the cited references fail to render the presently pending application obvious. The present invention, as recited in independent claims 1,30 and 31 teaches the use of multiple agents, wherein each of the agents leave their own trail (i.e. by updating the pheromone value of the cells that they have passed through). In the cited references a value of 1 is set if the cell is on the structure and a value of 0 is set if the cell is

off the structure. In contrast to this approach, the present invention provides for multiple agents which originate at multiple locations. The locations of these multiple agents are followed as these agents follow different structures. For example, if multiple agents saw the same cell, there is a higher likelihood that this cell is on a real structure.

This multiple agent concept is neither taught nor suggested by Ishisaka or Schultz, when taken alone or in combination. In Ishisaka, a single agent traces around the boundary of a single object and then terminates when it has traveled around the entire boundary. There is no need for a pheromone value in Ishisaka because there is only one agent and they can use the value 0 for being off the structure and 1 for being on the structure.

The tracing of many agents, in accordance with the present invention, is recited throughout the current specification. For example, as recited at page 13 of the present application,

> "Magnitude of the pheromone track: If a structure is heavily marked by pheromone, it has been detected and successfully traced by many agents. This means that the structure is visible from many deployment points, and that it conforms to the expected properties encoded in the agents"

Additionally, as recited at pages 7 and 8 of the current application:

> "The last term in the function, pheromone(pixel), provides communication between the agents in terms of the 'pheromone' trace each agent emits along its trace. This sub-function merely returns the total amount of pheromone emitted to this pixel from other agents, which will add to the function value. This way, pheromone left by an agent will affect what is considered a local maximum by other agents, and may thus attract other agents into choosing the same trace."

Furthermore, as recited at page 17:

> "It is desired, however, to allow communication between the agents, and thus take the pheromone traces left by other agents into consideration when searching for local maxima. The objective function that will be encoded into the agents is hence:

$z(pixel) = \omega_0 chkgrey(pixel) + \omega_1 pheromone(pixel).$

Setting $\omega_1 > 0$ will attract succeeding agents into choosing the same paths as the ones chosen by previous agents. This may create a sharper image, since the agents are more likely to choose the same paths instead of parallel ones. However, this also makes the results less deterministic, since the order in which the agent are deployed into the image will have significant impact on the final result."

In accordance with the present language, as well as Figure 1 of the present application, Applicant submits that the "pheromone" value of a cell is updated when a cell is selected and the magnitude of the pheromone value of a cell is defined by the number of agents that have detected and successfully traced a structure or structures passing through the cell. Applicant therefore submits that this concept is not disclosed or suggested by any of the prior art references. The extent to which an agent will be influenced into selecting a pixel having a large pheromone value over a nearby cell having a smaller pheromone value is determined by the relative weighting, ω_1, of the pheromone value in the agent's objective function versus the relative weighting, ω_0, of the other component(s) of the objective function.

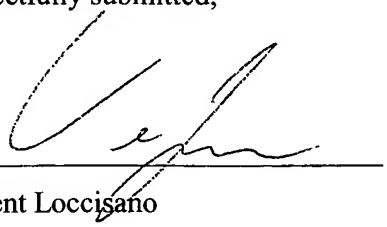
Applicant further submits that the reference to a pheromone value associated with a cell, as used in the Schultz reference is not applicable to the present invention. As set forth in Schultz, the reference to a pheromone value relates to a chemical "sent" used by a variety of biological creatures. In contrast, the "pheromone value" of the present invention is an electronic value which reflects the number of agents that have detected and successfully traced a structure(s) passing through a cell. In view of such vast differences is application of the term "pheromone value" Applicant submits that the Schultz reference fails to teach or suggest the present invention recited by independent claims 1,30 and 31.

Applicant respectfully asserts that the method, computer system, and computer program product as currently claimed are not recited by the Ishisaka and Schultz references. In view of this, Applicant believes that presently pending claims 1, 30 and 31 are in condition for allowance. Furthermore, Applicants submits that those dependent claims which rely on independent claim 1 for support are further in condition by their very nature as dependent

claims. In view of this, Applicant urges the Examiner to withdraw the rejection to the presently pending claims, and issue a timely Notice of Allowance.

The Commissioner is hereby authorized to charge or credit any deficiency or overpayment to Deposit Account **N°. 19-0615**. This sheet is filed in duplicate.

Respectfully submitted,



Vincent Loccisano
Registration No. 55,397

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Schlumberger-Doll Research
36 Old Quarry Road
Ridgefield, Connecticut 06877-4108
(617) 252-4727